

Appl. No. : 07/380,106
Filed : November 24, 1999

REMARKS

Claims 5, 6, 8, and 10 have been cancelled. Claims 1-3, and 7 have been amended. Claims 11-25 have been added. Claims 1-4, 7, 9 and 11-25 are now pending in this application. Amendments are made to clarify the claimed subject matter. Support for the amendment to claim 1 is found in cancelled claim 6. Support for new claim 11 is found in original claim 1 and also in the present specification at page 11, last paragraph. Support for new claim 12 is found in original claims 1 and 3. Support for new claims 13-16 is found in original claim 1. Support for new claim 17 is found in original claim 1 and in the specification at page 5, lines 8-12 and Example 2. Support for new claim 18 is found in original claim 5. Support for new claims 19, 21, and 25 is found in original claim 4. Support for new claims 20 and 22 is found in original claim 8. Support for new claims 23-24 is found in cancelled claim 10. Accordingly, the amendments do not constitute the addition of new matter. Applicant respectfully requests the entry of the amendments and reconsideration of the application in view of the amendments and the following remarks.

Abstract

An Abstract on a separate sheet is submitted with this response.

Rejections under 35 U.S.C. § 102(b)

Claims 1, 2, 4, 6, and 7 are rejected under 35 U.S.C. § 102(b) as anticipated by Roussaux. The Examiner asserts that Roussaux teaches production of shoots in peas inoculated with *Corynebacterium fascians*.

In response, Roussaux fails to anticipate the claimed invention because Roussaux does not teach plant micropropagation. Roussaux merely describes what is observed biologically upon infection of pea with *C. fascians*. Roussaux does not teach a micropropagation method. Applicants submit that the Examiner has constructed this ground of rejection from different aspects of the reference. It is a well established tenet of patent law that the reference must be considered as a whole. The Roussaux reference taken as a whole does not teach micropropagation.

As further evidence of the inapplicability of Roussaux to Applicants' claimed invention, Applicants point out that the date of the Roussaux reference is 1965. And yet no one has used *R. fascians* or related microorganisms in a method of plant micropropagation until Applicants' invention. If the teaching of the claimed invention was truly contained within the Roussaux

reference, Applicants submit that micropropagation using *R. fascians* would already be in use. However, this is not the case as Roussaux did not disclose Applicants' invention.

Applicants also assert that new claims 11-25 are not anticipated by Roussaux. Roussaux does not teach identification of factors that can be used to induce fasciation, independently from contacting with the whole bacterium.

In view of Applicants' amendments and arguments, reconsideration and withdrawal of this ground of rejection is respectfully requested.

Claims 1, 2, 6, 7, and 9 are rejected under 35 U.S.C. § 102(b) as anticipated by Mantell et al. The Examiner asserts that Mantell et al. teach micropropagation involving the preparation of an explant, setting it in contact with a cytokinin and transfer to a medium with reduced or removed cytokinin level and the transfer of the shoot to soil. The Examiner further asserts that cytokinins can be derived from *C. fascians*.

In order to have anticipation, all of the elements of the anticipated claim must be contained within a single reference. In the present case, Mantell et al. do not teach the use of a microorganism that induces fasciation. While the Examiner asserts that cytokinins can be derived from *C. fascians*, the Examiner provides no support for this assertion.

Furthermore, even if cytokinins can be derived from *C. fascians*, Mantell et al. do not anticipate the present claims as amended. Cytokinins are not equivalent to a microorganism that induces fasciation. Cytokinins are a group of chemical compounds with a defined structure. Microorganisms are complex biological systems. For example, the specification at page 3, lines 21-24 teach that metabolites are present in galls that are involved in the establishment and maintenance of the leafy gall structure. Consequently, the use of galls in plant micropropagation would not be expected to be equivalent to the use of cytokinins. Indeed, Applicants teach certain disadvantages in using cytokinins with plant propagation (present specification, page 2, line 24 to page 3, line 7). The practice of the claimed invention unexpectedly avoids these disadvantages. Consequently, the present claims cannot be anticipated by the teaching of Mantell et al. on cytokinins.

Applicants also assert that new claims 11-25 are not anticipated by Mantell et al. There is no disclosure in Mantell et al. that cytokinins are produced from the pFiD188 plasmid and that these cytokinins may be used for *in vitro* micropropagation of plants.

In view of Applicants' arguments, reconsideration and withdrawal of this ground of rejection is respectfully requested.

Rejection under 35 U.S.C. § 103(a)

Claims 1-10 are rejected under 35 U.S.C. § 103(a) as being unpatentable over either one of Roussaux or Mantell in view of Bhojwani et al. and Stange et al.

The Examiner asserts that Roussaux teaches a method of shoot multiplication using bacteria; Mantell et al. teach in vitro shoot multiplication using cytokinins. While neither Roussaux nor Mantell teach a method where shoots are subjected to growth limiting conditions after multiplication, Bhojwani et al teach a method of germplasm storage by cryopreservation. Stange et al are cited for their teaching that *R. fascians* produces cytokinins and that the bacterial synthesis of cytokinins is responsible for disease symptoms. The Examiner concludes that it would have been obvious to modify the method of Roussaux or Mantell with storage of plant material under growth limiting conditions and that motivation to do so is found in Stange et al. who teach that exogenous kinetin results in altered development.

As is well-known, a *prima facie* case of obviousness requires that three basic criteria be met. First, there must be some suggestion or motivation, either in the references themselves or in the knowledge generally available to one of ordinary skill in the art, to modify the reference or to combine reference teachings. Second there must be a reasonable expectation of success. Finally, the prior art reference (or references when combined) must teach or suggest all the claim limitations. The teaching or suggestion to make the claimed invention and the reasonable expectation of success must both be found in the prior art, and must not be based on Applicants' disclosure.

In the present case, there is no motivation to combine the cited references and there is no reasonable expectation of success. Although Roussaux describes the process by which *R. fascians* infects pea plants, Roussaux does not teach or suggest the use of *R. fascians* in a method of plant micropropagation. That is, Roussaux merely describes a biological process. Roussaux does not translate these observations into a means to micropropagate plant species.

As discussed above, Applicants submit that the Examiner has constructed this ground of rejection from different aspects of the reference. It is a well established tenet of patent law that the reference must be considered as a whole. The Roussaux reference taken as a whole does not teach micropropagation.

As further evidence of the inapplicability of Roussaux to Applicants' claimed invention, Applicants point out that the date of the Roussaux reference is 1965. And yet no one has used *R. fascians* or related microorganisms in a method of plant micropropagation until Applicants' invention. If the teaching of the claimed invention was truly contained within the Roussaux reference, Applicants submit that micropropagation using *R. fascians* would already be in use. However, this is not the case as Roussaux did not disclose Applicants' invention.

The deficiencies of Roussaux are not corrected by the secondary references. There is no teaching or suggestion provided to combine the teaching of Bhojwani on cryopreservation with the observations published by Roussaux.

Regarding Stange et al., this reference teaches production of disease symptoms by *R. fascians*. There is no motivation provided and no reasonable expectation of success for one of ordinary skill in the art to use a microorganism associated with a disease condition in plants in a method for plant micropropagation.

Regarding Mantell et al, this reference merely teaches micropropagation of plants by standard methods such as application of plant hormones such as cytokinins. Mantell et al. is completely silent on the use of fasciating microorganisms for any purpose. Although Stange et al. teach that *R. fascians* produces cytokinins, this teaching would not motivate one of ordinary skill in the art to use *R. fascians* for micropropagation of plants because of the undesirable effects of these bacteria in producing disease symptoms as taught by Stange et al.

Motivation to use a fasciating microorganism such as *R. fascians* in such a method of micropropagation is also not found in Bhojwani, et al. which is directed to cryopreservation. One of ordinary skill in the art would not be motivated to turn to a teaching on cryopreservation to modify the teaching of the primary references. While use of low temperature in tissue preservation is known, there is no motivation provided by the Examiner from the cited references to include a low temperature step in in a method of micropropagation. Furthermore, there is no teaching provided in any of the cited references on the use of leafy galls or shoot outgrowths produced by fasciating microorganisms as a vehicle for storage of plant germplasm.

Furthermore, even if a *prima facie* case of obviousness has been set forth (and Applicants maintain that it has not), the results obtained by Applicants using fasciating microorganisms instead of plant hormones such as cytokinins for plant micropropagation were totally unexpected. As taught by the specification, conventional plant propagation may cause abnormal features such

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as small shoots that fail to elongate, induction of unusual leaf shapes and a tendency of regenerated shoots to become vitrified (present specification, page 2, lines 24-30). In addition, high concentrations of cytokinins used for shoot formation may inhibit root formation (specification, page 2, lines 31-38) and some species are refractory to micropropagation using hormones (specification, page 3, lines 1-3). The practice of the claimed invention unexpectedly avoids at least some of these disadvantages (present specification, page 3, lines 8-16).

Regarding new claims 11-25, none of the cited references teach or suggest identification of factors that can be used to induce fasciation which are produced from the pFiD188 plasmid.

In view of Applicants' amendments and arguments, reconsideration and withdrawal of this ground of rejection is respectfully requested.

Rejection under 35 U.S.C. § 112, first paragraph

Claims 1, 2, 5, 8, 9, and 10 are rejected under 35 U.S.C. § 112, first paragraph as containing subject matter which is not described in the specification in such a way so as to enable one skilled in the art to which it pertains to make and/or use the invention.

The Examiner has neglected to set forth the basis for this ground of rejection. As described in M.P.E.P. 707.07(d), "the ground of rejection [should be] fully and clearly stated." Applicants maintain that claims 1, 2, 5, 8, 9, and 10 are fully enabled by the present specification. If the Examiner chooses to maintain this rejection, it is respectfully requested that the reasons for the rejection be clearly set forth.

Rejection under 35 U.S.C. § 112, second paragraph

Claims 1-10 are rejected under 35 U.S.C. § 112, second paragraph as being indefinite for failing to particularly point out and distinctly claim the subject matter which applicant regards as the invention.

These ground of rejection are believed to be overcome by Applicants' claim amendment except for the rejection of claims 8-10 for the use of the term "conventional growing condition." In response, this term is supported by the specification at page 5, lines 6-7. It is respectfully submitted that one skilled in the art would understand what is intended by "conventional growing condition."

In view of Applicants' amendments and arguments, reconsideration and withdrawal of all grounds of rejection under 35 U.S.C. § 112, second paragraph is respectfully requested.

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CONCLUSION

In view of Applicants' amendments to the claims and the foregoing Remarks, it is respectfully submitted that the present application is in condition for allowance. Should the Examiner have any remaining concerns which might prevent the prompt allowance of the application, the Examiner is respectfully invited to contact the undersigned at the telephone number appearing below.

Please charge any additional fees, including any fees for additional extension of time, or credit overpayment to Deposit Account No. 11-1410.

Respectfully submitted,

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